PlatformConference
Direction • Design • Perspective • Analysis

HyperTransport™ and InfiniBand Technologies:

The Complete High Bandwidth I/O Solution

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Agenda

- Introduction
- HyperTransport™ Technology Overview
- InfiniBand Overview
- HyperTransport™ and InfiniBand Technologies Together
- Conclusion

Introduction

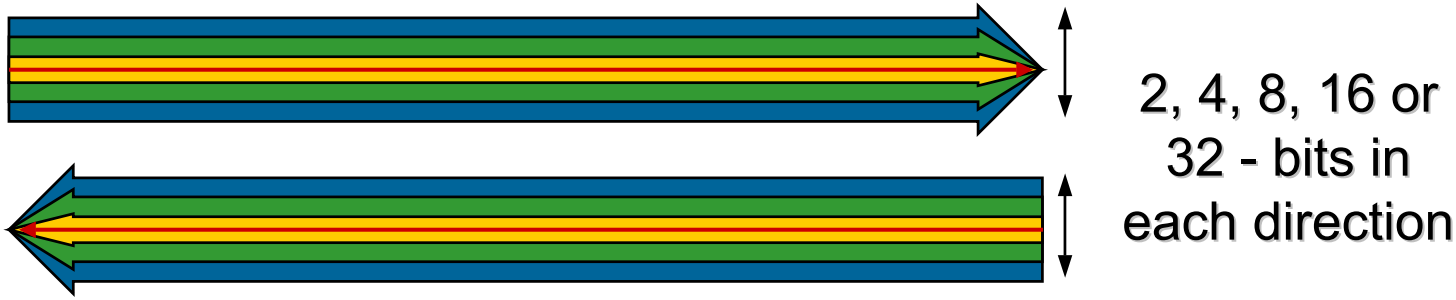
- Industry Trends Leading to Increasing Data Usage
- This Creates an I/O Communication Strain
 - Internal
 - External

HyperTransport™ Technology Overview

- What is HyperTransport™ Technology?
 - High Speed Chip-to-Chip Interconnect
- HyperTransport Consortium
 - Evolution of Specification
 - Promote Industry Adoption
- Designed with the Following Features in Mind:
 - Increased I/O Bandwidth
 - Improved Scalability
 - Minimal Extra Software Support Needed
 - Straightforward Physical Implementation
 - Reduced Power Requirements

HyperTransport™ Technology Features

- Increased I/O Bandwidth
 - FSB, System Memory, Graphics Connections have Grown (to ~17 Gbps)
 - In general, however, not the North Bridge-South Bridge Link
 - HyperTransport™ Technology offers the Bandwidth:
 - Up to 800 MHz (sampled twice per period)
 - Up to 32-bit each way (up to 51.2 Gbps)

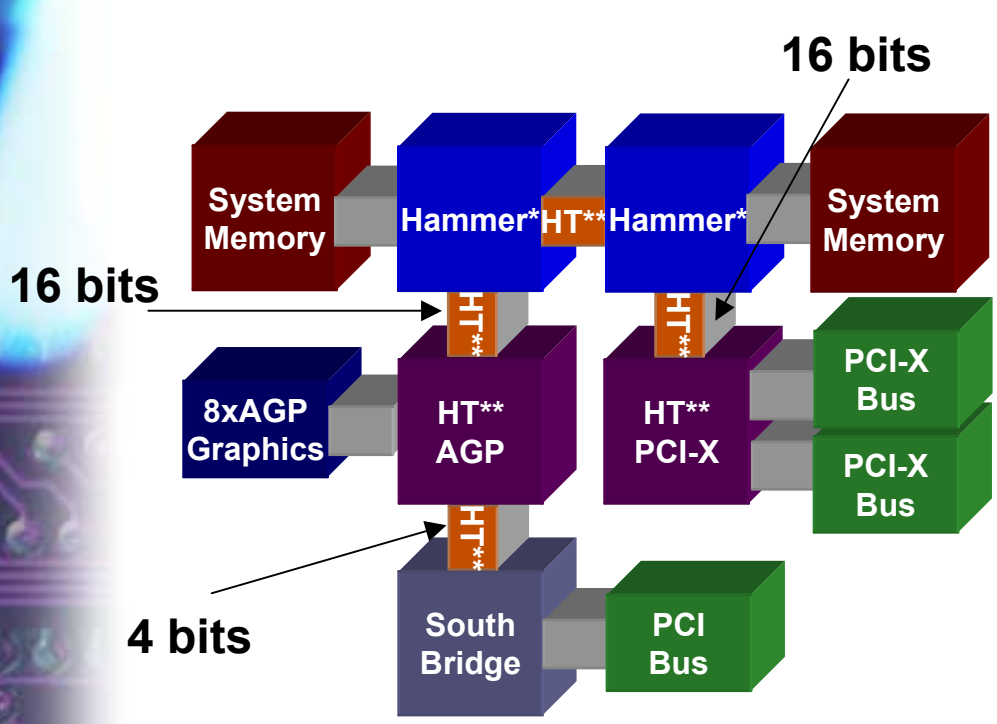


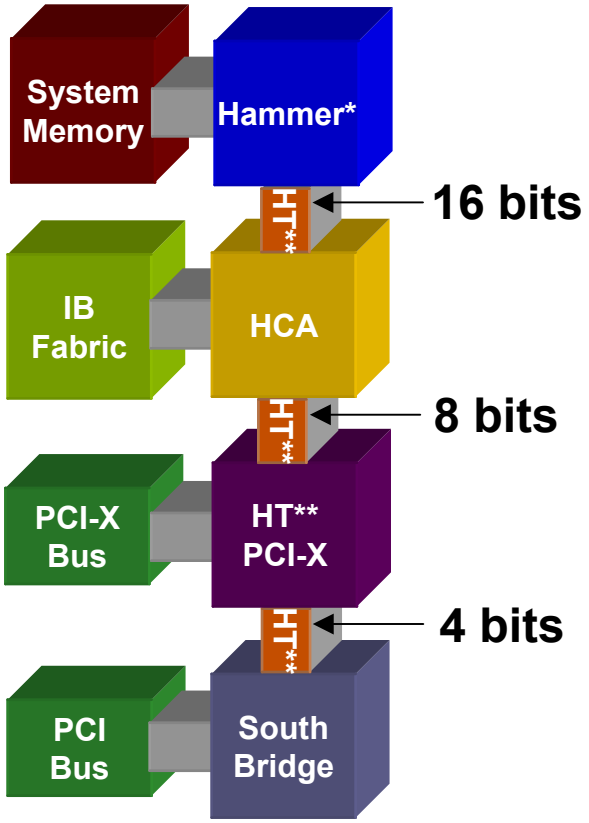
HyperTransport™ Technology Features 2

- Improved Scalability
 - More and More Devices are Needed
 - Each may have different bandwidth demands
 - HyperTransport™ Technology:
 - Varying pipe widths and different bus speeds
 - Tunneling

Clock Rate \ Link Width	2 bits	4 bits	8 bits	16 bits	32 bits
200 MHz	0.8 Gbps	1.6 Gbps	3.2 Gbps	6.4 Gbps	12.8 Gbps
400 MHz	1.6 Gbps	3.2 Gbps	6.4 Gbps	12.8 Gbps	25.6 Gbps
500 MHz	2.0 Gbps	4.0 Gbps	8.0 Gbps	16.0 Gbps	32.0 Gbps
600 MHz	2.4 Gbps	4.8 Gbps	9.6 Gbps	19.2 Gbps	38.4 Gbps
800 MHz	3.2 Gbps	6.4 Gbps	12.8 Gbps	25.6 Gbps	51.2 Gbps

Possible “Hammer”* Platforms





* “Hammer” is the codename for AMD’s 8th generation processor.
** HT = HyperTransport™.

HyperTransport™ Technology Features 3

- Minimal Software Changes Required
 - Leverage Existing Infrastructure
 - HyperTransport™ Technology Supports PCI Features:
 - Plug-n-Play
 - PCI-like enumeration

HyperTransport™ Technology Features 4

- Straightforward Physical Implementation
 - Keep Costs Down and Design Simple
 - HyperTransport™ Technology Requires:
 - No extra glue logic or hardware
 - Low pin count
- Reduced Power Requirements
 - Fight Increasing Cooling and Energy Costs
 - HyperTransport Technology Provides:
 - Low voltage signaling
 - Power-saving features

InfiniBand Overview

- What is InfiniBand?
 - High Speed Network+I/O Architecture (2.5 Gbps → 30Gbps)
 - Nodes are HCAs, TCAs, Switches, or Routers
- InfiniBand Trade Association
 - Specification Definition
 - Promote compatibility and interoperability

InfiniBand Features

- Security
 - Information is power, Downtime is money
 - InfiniBand uses keys natively
- Scalability
 - Make upgrade and servicing costs low
 - Subnet Manager automatically detects fabric topology
 - Initializes nodes

InfiniBand Features 2

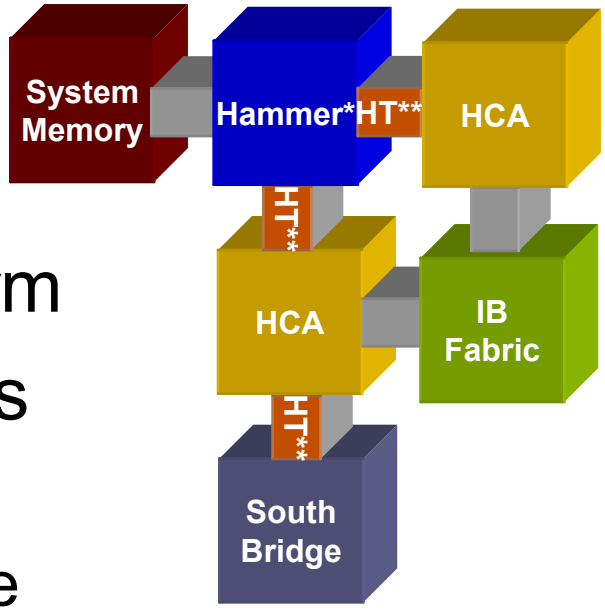
- Reliability
 - Quality of Service is important
 - InfiniBand provides Service Levels
- Standardization
 - Strengthens Scalability and Reliability
 - Replacement and servicing are made easier
 - The IBTA working to establish this
 - CIWG hold Plugfests, publishes tests, etc.

HyperTransport™ and InfiniBand Technologies

- Bandwidth
 - HyperTransport™ Technology Provides the Necessary BandWidth to support InfiniBand
 - Up to 51.2 Gbps to support up to 30 Gbps
- Similar Protocols
 - Support Same Atomic Operations
 - I/O Streams of HyperTransport Technology and Service levels of InfiniBand

HyperTransport™ and InfiniBand Technologies 2

- Reliability
 - Error detection (CRCs)
 - Redundancy
- Scalability
 - Multiple HCAs in a platform
 - Power down extra devices
 - Redundancy
 - Adapt to Daily Usage Cycle



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Conclusion

- Summary
- Questions?
 - Answers!

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Backup Slide

Common Motherboard Layout

